

STEM Scale-Up Program

Menu for 2020-2021

GREATNESS[®]
STEMS
FROM IOWANS

GOVERNOR'S STEM ADVISORY COUNCIL

2020-2021 STEM Scale-Up Program Menu

Bootstrap: Data Science.....4

Description: Students develop questions and learn how to analyze data critically to make meaning from the data. Flexibly designed for inclusion within courses such as math, computer science, business, and social studies.

Grade Level: 8-12

Contact: Jennifer Poole, Bootstrap, jen@bootstrapworld.org

For more information: <https://www.bootstrapworld.org/materials/data-science/>

Computer Science Discoveries.....5

Description: Inspire students as they build their own websites, apps, games and physical computing devices. This course takes a wide lens on computer science by covering topics such as programming, physical computing, HTML/CSS and data.

Grade Level: 6-10

Contact: Samantha Dahlby, NewBoCo, samantha@newbo.co

For more information: <https://newbo.co/code-org-partnership/>

Computer Science Fundamentals.....6

Description: Foster equity and diversity in the classroom, breaking down barriers and stereotypes around computer science. This course is designed to be flexible for the classroom.

Grade Level: K-5

Contact: Samantha Dahlby, NewBoCo, samantha@newbo.co

For more information: <https://newbo.co/code-org-partnership/>

Computer Science Principles.....7

Description: Introduce students to the foundational concepts of computer science and challenge them to explore how computing and technology can impact the world. This course is a rigorous, engaging and approachable exploration of the foundational ideas of computing.

Grade Level: 9-12

Contact: Samantha Dahlby, NewBoCo, samantha@newbo.co

For more information: <https://newbo.co/code-org-partnership/>

Curriculum for Agricultural Science Education (CASE) – Agricultural Power and Technology.....8

Description: Immerse students in inquiry-based exercises that tie in the math and science of agricultural mechanics and engineering. Throughout the course, students will apply technical skill while becoming competent in the process used to operate, repair, engineer, and design agricultural tools and equipment.

Grade Level: 9-12

Contact: Joshua Remington, Iowa FFA Foundation, Joshua.remington@iowaffafoundation.org

For more information: <https://www.case4learning.org/curriculum/case-courses/agricultural-power-and-technology>

Desmos Middle School Math.....9

Description: Desmos is a digital upgrade of the widely-adopted and highly-rated middle school math curriculum authored by Illustrative Mathematics. Desmos has added to IM's curriculum a) engaging game-like feedback, b) a powerful activity dashboard that helps teachers respond to student learning, c) and a continuous professional development model supporting teachers throughout the year.

Grade Level: 8

Contact: Dan Meyer, dan@desmos.com

For more information: bit.ly/desmos-iowa-sample

Differentiated Math Centers.....10

Description: An easy-to-manage resource that provides 3 levels of instruction tied to the same Standard of Learning. Each game or activity is standards-aligned, hands-on and complete with formative assessment writing prompt and skills practice.

Grade Level: K-5

Contact: Julie Law, jlaw@hand2mind.com

For more information: <https://www.hand2mind.com/Brands/Differentiated-Math-Centers>

Pint Size Science.....11

Description: Engage and inspire young minds to explore scientific phenomena. This course is designed to build science understanding and respond to the ever changing interests and abilities of children.

Grade Level: PreK-2

Contact: Jolie Pelds, Science Center of Iowa, jolie.pelds@sciowa.org

For more information: <https://www.sciowa.org/scaleup>

Project Lead The Way (PLTW) Cybersecurity.....12

Description: Introduce the tools and concepts of cybersecurity and encourage students to create solutions that allow people to share computing resources while protecting privacy. Students solve problems by understanding the vulnerability of computational resources and closing these vulnerabilities.

Grade Level: 9-12

Contact: Vic Dreier, PLTW, vdreier@pltw.org

For more information: <https://www.pltw.org/our-programs/pltw-computer-science-curriculum#curriculum-4>

STEM in Action.....13

Description: Incorporate three-dimensional learning with an emphasis on authentic hands-on, problem-based learning. This course follows the Engineering Design Process of defining the problem, planning solutions, making a prototype, reflecting, communicating results and redesigning.

Grade Level: PreK-5

Contact: Julie Law, Hand2Mind, jlaw@hand2mind.com

For more information: <https://www.hand2mind.com/brands/stem-in-action>

STEM Innovator.....14

Description: Transform the classroom into incubator spaces where student teams solve real-world problems alongside industry mentors. This course prepares students with the skills and mindset to persist in STEM education, pursue STEM careers and become innovators of the future.

Grade Level: 6-12

Contact: Leslie Flynn, University of Iowa, leslie-flynn@uiowa.edu

For more information: <https://jacobsoninstitute.org/STEM-Innovator>

VEX IQ Challenge.....15

Description: Provide the opportunity to learn introductory programming and engineering skills with a snap-together robotics system designed from the ground up.

Grade Level: 4-8

Contact: Mike Martus, REC Foundation, mike_martus@roboticseducation.org

For more information: <http://www.roboticseducation.org>

VEX V5.....16

Description: Provide the opportunity to learn introductory and advanced programming and engineering skills with a snap-together robotics system designed from the ground up.

Grade Level: 9-12

Contact: Mike Martus, REC Foundation, mike_martus@roboticseducation.org

For more information: <http://www.roboticseducation.org>

Bootstrap:Data Science 2020-2021 STEM Scale-Up Program

Grade Levels: 8-12, in school

Information Sessions: 4:00 PM 1/28, 2/6 <https://brown.zoom.us/j/4103397237>

Website: <https://www.bootstrapworld.org/materials/data-science/>

Award Provides:

- 3-day in-person training
- Educator stipend (\$150 per day) for attending all 3 days
- 25 student workbooks
- Breakfast and lunch during workshop
- Optional local hotel accommodation
- Access to online teacher materials
- Access to printable workbook PDF
- Year-round support
- Online network of Bootstrap educators

Additional Cost(s) to Awardee In 2020-2021:

- Travel to and from workshop
- Meals outside of workshop hours

Approximate Sustainability Cost After Award Period:

- Printed and bound student workbooks (optional), \$10/per
- Workbook PDF available for self-printing
- Curriculum available online and free forever

Program Summary:

What factors make a song a hit? Why do some people live longer than others? Who is the most dominant football player of all time? In a world awash in big data, being able to make sense of that data is a critical skill for everything from public policy to molecular biology, and from software development to shipping logistics. Writing code to crunch huge datasets is great, but coding should go hand in hand with being able to mathematically think, talk and analyze. Data is everywhere, and students must learn to transfer their mathematical knowledge and leverage their natural curiosity about data to ask deep questions, make decisions, perform meaningful analysis, and present and critique their findings.

In Bootstrap:Data Science, students form their own questions about the world around them, analyze data using multiple methods, and write a research paper about their findings. The module covers datasets, functions, iteration, data visualization, linear regression, and more. Social studies, science, and business teachers can utilize this module to help students make inferences from data. Math teachers can use this module to introduce and reinforce foundational concepts in statistics, and it is aligned to the Data standards in CS Principles.

The module starts with the basics and can be integrated into a mainstream class, delivered by a teacher with no prior CS experience. In this intensive three-day workshop, teachers will work through the entire module while learning pedagogical practices, implementation techniques, and collaborating with other educators. Teachers leave the workshop with the skills and resources they need to effectively implement the Bootstrap:Data Science material in their classroom in the 2020-2021 school year.

Bootstrap was founded in 2005 and now reaches over 20,000 students annually. Bootstrap has a stated commitment to equity and is one of the largest providers of in-school CS education for underrepresented students in CS. This research-driven effort blends and leverages students' existing math knowledge with computer science and empowers underrepresented student populations to engage meaningfully in these disciplines. The material integrates with the Iowa Core Standards in Mathematics, Standards of Mathematical Practice, and NGSS Science and Engineering practices.

Requirements to Implement the Program:

Educator(s) must participate in all onsite sessions. Teams of two or more educators from the same district (can be different disciplines) receive priority registration.

Professional Development:

A three-day in-person workshop

Duration: 3 days onsite

Date(s): TBD, Summer 2020

Location: TBD

STEM Scale-Up Program Application Link: www.iowaSTEM.gov/Scale-Up-Application

Computer Science Discoveries 2020-2021 STEM Scale-Up Program

Grade Levels: 6-10, available in school

Website: <https://newbo.co/code-org-partnership/>

Video Link: <https://youtu.be/2-QpgNHknds>

Award Provides:

- Curriculum by Code.org.
- Connections with other Iowa computer science teachers through in-state support network.
- Opportunity to earn licensure renewal or graduate credit.
- Ongoing support during implementation from NewBoCo staff, facilitators, and online forums.
- Travel stipend of \$50 per workshop day.
- Per diem stipend of \$60 per workshop day for teachers' time.
- \$100 to cover classroom supplies.
- Full Circuit Playground Classroom Kit for Unit 6.

Additional Cost(s) to Awardee In 2020-2021:

- None

Approximate Sustainability Cost After Award Period:

- The curriculum is free forever. Estimated classroom supply costs are \$100 per class, with some supplies that can be reused year after year.

Program Summary:

Computer Science Discoveries is appropriate for 6 - 10th grade students and can be taught as a semester or year long introductory course (3-5 hours per week of instruction for 9+ weeks). The course takes a wide lens on computer science by covering topics such as programming, physical computing, HTML/CSS, and data. The course inspires students as they build their own websites, apps, games, and physical computing devices.

NewBoCo's year-long Professional Learning Program provides ongoing support for teachers, requiring no prior computer science experience to get started. The curriculum and workshops are also designed to foster equity and diversity in the classroom, breaking down barriers and stereotypes around computer science.

In addition, the curriculum is available online at no cost for anyone, anywhere to teach. For more information about Code.org's goals and approach to their courses, please visit their website for curriculum values and professional learning values.

Requirements to Implement the Program:

Educator(s) must participate in all nine workshop days throughout the year and also submit a Code.org application (in addition to the STEM Scale-Up application) at <https://newbo.co/code-org-partnership/#apply>.

A memorandum of understanding signed by the building administrator is required before training or materials can be delivered.

Professional Development:

A five-day summer workshop will be held July 27-31, 2020. Location is yet to be finalized. Four, one-day Saturday workshops will be held during the academic year.

Duration: 1 week, plus four 1-day Saturday workshops

Date(s): July 27-31, 2020

Location: Final location TBD with potential alternate academic year workshop locations based on the size of the cohort.

Information Session:

To learn more about this program and have questions answered, please join a virtual information session on Tuesday, January 28th at 7:30am via Zoom. You may register to join at <http://bit.ly/20-21Webinar>. Contact your STEM Region manager for a link to the recording if you are unable to attend.

STEM Scale-Up Program Application Link: www.iowaSTEM.gov/Scale-Up-Application

Computer Science Fundamentals 2020-2021 STEM Scale-Up Program

Grade Levels: Kindergarten-5, available in school or out of school

Website: <https://newbo.co/code-org-partnership/>

Video Link: <https://youtu.be/rNIM1fzJ8u0>

Award Provides:

- Curriculum by Code.org.
- Connections with other Iowa computer science teachers through in-state support network.
- Opportunity to earn licensure renewal or graduate credit.
- Ongoing support during implementation from NewBoCo staff, facilitators, and online forums.
- Lunch during the workshop.

Additional Cost(s) to Awardee In 2020-2021:

- None

Approximate Sustainability Cost After Award Period:

- The curriculum is free forever. Estimated classroom supply costs are \$25-\$50 per class, with many supplies that can be reused year after year.

Program Summary:

Code.org's six Computer Science Fundamentals courses are designed to be flexible for your K-5 classroom. How you implement is up to you - teach CS Fundamentals for your next science unit, use it to support math concepts, add technology time to your schedule once a week, or go deeper with extension activities and projects!

NewBoCo's 1-day CS Fundamentals Intro Workshop provides support for teachers, requiring no prior computer science experience to get started. The curriculum and workshop are also designed to foster equity and diversity in the classroom, breaking down barriers and stereotypes around computer science.

Code.org's curriculum was created with the 2017 Computer Science Teachers Association (CSTA) standards in mind, but also includes opportunities to support national Math, English Language Arts, and Science standards. In fact, a recent research study (<http://bit.ly/CSAchieve>) found that classrooms with resourceful teachers see higher scores on English, math, and science standardized tests after teaching these lessons. In addition, the curriculum is available online at no cost for anyone, anywhere to teach. For more information about Code.org's goals and approach to their courses, please visit their website for curriculum values and professional learning values.

Requirements to Implement the Program:

Educator(s) must register for one of the Iowa workshops offered throughout the state. STEM Region Managers will have registration links for workshops in each STEM region.

Professional Development:

Several 1-day workshops will be held throughout the 2020-21 year. Workshops require a minimum of 12 registrations to be held. If a workshop is cancelled due to low registration, you may register for another workshop. Workshops will be offered during the summer in all STEM regions that approve awards, and additional public workshops will be available throughout the school year.

Duration: 1 day

Date(s): Multiple options will be offered in July and August. STEM Region Managers will have registration links for workshops in each STEM region.

Locations: Multiple options will be offered in July and August. STEM Region Managers will have registration links for workshops in each STEM region.

STEM Scale-Up Program Application Link: www.iowaSTEM.gov/Scale-Up-Application

Computer Science Principles 2020-2021 STEM Scale-Up Program

Grade Levels: 9-12, available in school

Website: <https://newbo.co/code-org-partnership/>

Video Link: <https://youtu.be/jQm0z894CG0>

Award Provides:

- Curriculum by Code.org, recognized by the College Board as an endorsed provider.
- Connections with other Iowa computer science teachers through in-state support network.
- Opportunity to earn licensure renewal or graduate credit.
- Ongoing support during implementation from NewBoCo staff, facilitators, and online forums.
- Travel stipend of \$50 per workshop day.
- Per diem stipend of \$60 per workshop day for teachers' time.
- \$100 to cover classroom supplies.

Additional Cost(s) to Awardee In 2020-2021:

- None

Approximate Sustainability Cost After Award Period:

- The curriculum is free forever. Estimated classroom supply costs are \$100 per class, with some supplies that can be reused year after year.

Program Summary:

Computer Science Principles introduces students to the foundational concepts of computer science and challenges them to explore how computing and technology can impact the world. More than a traditional introduction to programming, it is a rigorous, engaging and approachable course that explores many of the foundational ideas of computing so all students understand how these concepts are transforming the world we live in.

Our year-long Professional Learning Program provides ongoing support for teachers, requiring no prior computer science experience to get started. The curriculum and workshops are also designed to foster equity and diversity in the classroom, breaking down barriers and stereotypes around computer science.

This year-long course can be taught as an AP or non-AP course—no prerequisites required for students or for teachers new to computer science! Students will explore topics like the Internet and how it works; how and why digital information is encoded, represented and manipulated; privacy; and programming. In addition, the curriculum is available online at no cost for anyone, anywhere to teach. For more information about Code.org's goals and approach to their courses, please visit their website for curriculum values and professional learning values.

Requirements to Implement the Program:

Educator(s) must participate in all nine workshop days throughout the year and submit a Code.org application at <https://newbo.co/code-org-partnership/#apply>.

A memorandum of understanding signed by the building administrator is required before training or materials can be delivered.

Professional Development:

A five-day summer workshop will be held July 27-31, 2020. Location is yet to be finalized. Four, one-day Saturday workshops will be held during the academic year.

Duration: 1 week, plus four 1-day Saturday workshops

Date(s): July 27-31, 2020

Location: Final location TBD with potential alternate academic year workshop locations based on the size of the cohort.

Information Session:

To learn more about this program and have questions answered, please join a virtual information session on Tuesday, January 28th at 7:30am via Zoom. You may register to join at <http://bit.ly/20-21Webinar>. Contact your STEM Region manager for a link to the recording if you are unable to attend.

STEM Scale-Up Program Application Link: www.iowaSTEM.gov/Scale-Up-Application

Curriculum for Agricultural Science Education (CASE) - Agricultural Power and Technology 2020-2021 STEM Scale-Up Program

Grade Levels: 9-12, available in school

Website: <https://www.case4learning.org/curriculum/case-courses/agricultural-power-and-technology>

Video Link: https://www.youtube.com/watch?v=YNGvaj_fztA

Award Provides:

Professional Development Training Institute

- Two week training held during the summer
- Lodging
- Most meals
- All institute material expenses
- Materials/Equipment

Additional Cost(s) to Awardee In 2020-2021:

(examples: travel, lodging, substitutes, equipment, fees)

- Travel to and from the institute.
- Equipment beyond the \$8,500 award allocation. This will vary by school based on previous CASE program implementations.

Approximate Sustainability Cost After Award Period:

(examples: license fees, materials) \$1,150

Program Summary:

Agricultural Power and Technology course is a foundation course within the CASE™ sequence of courses. The course provides students a variety of experiences that are in the fields of agricultural engineering. Students are immersed in inquiry-based exercises that tie in the math and science of agricultural mechanics and engineering. Throughout the course, students apply technical skill while becoming competent in the process used to operate, repair, engineer, and design agricultural tools and equipment.

Requirements to Implement the Program:

- Attend two weeks of CASE™ Curriculum Institute (Institute dates and locations will vary)
- Commit to adopt and teach CASE™ curriculum upon return from institute (2021-2022 school year)
- Travel expenses
- Secure equipment and supplies to teach CASE™ course above the award allocation

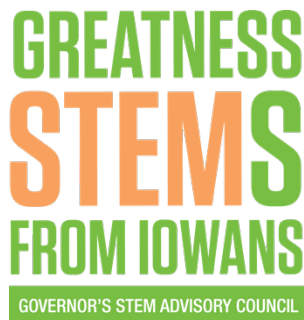
Professional Development:

Duration: 9 day workshop

Date(s): June or July of 2021. Course schedule will be released in late Oct. 2020

Location: Plan is to have one somewhere in central Iowa, location TBD

STEM Scale-Up Program Application Link: www.iowaSTEM.gov/Scale-Up-Application



Desmos 2020-2021 STEM Scale-Up Program

Grade Level: 8, available in school

Information Session: Tuesday 2/18/2020 @ 5 pm CST - register [here](https://bit.ly/scaleupdesmos) (bit.ly/scaleupdesmos)

Curriculum Sample: bit.ly/desmos-iowa-sample

Video Link: https://www.youtube.com/watch?v=-J7YXI5_ows

<p>Award Provides: One year of digital access to the Desmos Middle School Math Grade 8 curriculum.</p> <p>A two-hour webinar training.</p> <p>Access to ongoing support and professional development via email and webinar.</p> <p>\$50 stipend for attending the two-hour webinar training.</p> <p>Additional Cost(s) to Awardee In 2020-2021: None.</p> <p>Approximate Sustainability Cost After Award Period: The per-student cost of a curriculum license will not exceed \$24.</p>	<p>Program Summary: Desmos Middle School Math Grade offers full, daily curriculum for 8th grade. It is a digital upgrade of the widely-adopted and highly-rated middle school math curriculum authored by Illustrative Mathematics and published by OpenUp Resources in grade 8. Desmos has added to IM's curriculum a) engaging game-like feedback, b) a powerful activity dashboard that helps teachers assess and respond to student learning, c) and a continuous professional development model supporting teachers throughout the year.</p> <p>This curriculum is problem-based which means it's full of tasks designed to engage and challenge <i>all</i> learners. You won't start lessons by pre-teaching mathematical ideas. You won't see students start class bored and disengaged. Instead, our curriculum will draw out student ideas through engaging activities that involve sketching, predicting, brainstorming, creating, and arguing, all with digital feedback that helps students learn and develop their math identities.</p> <p>Many lessons have a paper component to keep students balanced between online and offline activities. All lessons support the Iowa Core Practice Standards and the Characteristics of Effective Instruction.</p> <p>A collection of digital supplemental materials (one lesson per week) for grades 6-7 are available at no additional cost.</p> <p>Learn more at the video link above! Email lizzie@desmos.com with questions.</p> <p>Requirements to Implement the Program:</p> <ul style="list-style-type: none"> • Educators must attend a two-hour web-based professional development session. • Educators must attend a virtual check-in with other Iowa educators in the first month of school. • Educators must submit lesson and Unit level feedback to improve the curriculum. • Educators must administer student surveys at the beginning, mid-year and end of the school year. • Students must have access to at least one device for every two students. • A memorandum of understanding signed by the building administrator is required before training or materials can be delivered. <p>Professional Development: Duration: 2 hours Date(s): Dates offered throughout the summer and fall. Exact dates are TBD. Location: Webinar</p> <p>Duration: 45 min Date(s): Dates offered during the first month of school. Exact dates are TBD. Location: Webinar</p> <p>Duration: Periodic and varies Dates(s): Dates offered during entire school year. Exact dates are TBD. Location: Webinar</p>
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STEM Scale-Up Program Application Link: www.iowaSTEM.gov/Scale-Up-Application

Differentiated Math Centers

2020-2021 STEM Math Scale-Up Program

Grade Levels: K-5

Website: <https://www.hand2mind.com/Brands/Differentiated-Math-Centers>

Video: <https://www.youtube.com/watch?v=Eel-wlFnVSE>

Differentiated Math Centers Correlations:

<https://drive.google.com/drive/folders/1mWdfSLe4GiAQdHs2vX8J8Znhm3TJNUdu>

Award Provides:

- Differentiated Math Center Kit – Grade Level Appropriate

Each kit includes:

- 63 Student Activity Cards
- 3 Lesson Planner Cards
- 3 Teacher Notes
- Grade Level Lesson Planner Cards
- Manipulatives
- Up to 23 grade appropriate manipulatives in each kit

Additional Cost(s) to Awardee In 2020-2021:

- N/A

Approximate Sustainability Cost After Award Period:
N/A

Program Summary:

Support differentiated instruction in your classroom. Three levels of content enable teachers to address a wide range of student needs. These standards-based centers include activities and manipulatives that help students deepen their understanding of key math concepts.

- Kits include 63 total activities with 3 levels of content for each learning objective.
- Easy-to-read activity cards and hands-on tools are stored in a clear, durable tote.
- Ready-to-use streamlined solution for centers and small groups.

Integrate leveled math centers into your routine.

- Pick a topic to easily plan centers - **Focus** on the objectives where teachers spend a majority of instructional time.
- Select content at 3 levels - **Differentiate** essential objectives through leveled content – Below, On, and Above.
- Grab manipulatives - **Explore** concepts with hands-on manipulatives, up to 23 grade appropriate manipulatives in each kit. Enough math manipulatives for centers and small groups.

Requirements to Implement the Program:

- Educator(s) choose a Differentiated Math Centers Kit, Grade Level appropriate.
- A memorandum of understanding (MOU) signed by the building administrator is required before materials can be delivered.

Professional Development:

- Recorded webinar modeling the implementation of Differentiated Math Centers will be available to watch starting July 1, 2020. Awardees who do not watch the recorded webinar by September 11, 2020 forfeit the Program/Award.
- Follow-up live webinar will be held between December 2020 and March 2021 for awarded educators to network and answer questions post implementation.

STEM Scale-Up Program Application Link: www.iowaSTEM.gov/Scale-Up-Application

Pint Size Science 2019-2020 STEM Scale-Up Program

Grade Levels: PreK-2, available in or out of school

Information Session: 4 PM, 2/6, <https://uni.zoom.us/j/746193422>

Website: www.sciowa.org/scaleup

Video Link: https://www.youtube.com/watch?v=QP_sOIH8nMY&t=5s

Award Provides:

- Full day of Professional Development
- Program guide including lesson prompts, teacher resources and books for teacher instruction
- A kit of four curriculum modules with lesson plans and classroom materials for implementation
- Additional resources, including a variety of videos and assessments accessible through the PSS website
- Multiple webinar sessions offered for ongoing professional development and collaboration amongst implementers
- Educator stipend/sub-pay (\$120) to attend professional development
- Travel stipend (\$50) to attend professional development

Additional Cost(s) to Awardee In 2019-2020:

- Opportunity for teacher license or CEU's

Approximate Sustainability Cost After Award Period:

- Replacements of consumables are not to exceed \$50

Program Summary:

Pint Size Science introduces children to STEM topics through discovery learning. Using a hands-on approach that engages and inspires young minds to explore scientific phenomena, the program works to not only build science understanding but also respond to the ever-changing interests and abilities of children. Pint Size Science includes a literacy component that pulls together the most important ideas of the STEM topic being discussed. Fundamental mathematical skills are also reinforced through activities, including counting, numbering, and graphing.

The Pint Size Science kit includes four modules of lesson prompts, materials for investigation and children's literature. The foundation of the program is the introduction module titled, "Science Sprouts". This provides an introduction to the STEM fields and scientific investigation. Recognizing the need to be flexible to existing school curriculum materials and needs of organizations, schools and students, Pint Size Science allows educators to pick the remaining three modules to complete their set of instructional materials. Implementers chose one module from each of the following groups:

Group 1	Group 2	Group3
Bits and Bots will provide an introduction for students in learning programming and coding	Classifying Creatures develops math skills in sorting and classifying as children observe and compare features of various animals and insects	Exploring Engineering continues children's natural curiosity in to how things work
Colorful Chemistry introduces young learners to the three phases of matter found on earth; solids, liquids and gases	Mini Meteorologist inspires students to measure and understand the weather happening around us	Push and Pull investigates the forces that cause motion
Tiny Tinkerers brings the Maker Movement to the early childhood learning environment	Homes and Habitats challenges students to think about where different animals live based on their environments	Fascinating Farmers brings the world of agriculture to young children

Requirements to Implement the Program:

Educator(s) must attend a full day of professional development. A memorandum of understanding signed by the building administrator is required before training or materials can be delivered.

Professional Development:

Training to create deeper connections and instructional techniques to implement a STEM rich environment with a focus on inquiry, project-based learning, questioning and evaluation of student learning. Training includes a walk-through of each classroom curriculum module.

Duration: 1 day

Date(s): Multiple options in each region will be offered July-September 2019

Location: Trainings are held in each of the six STEM regions

STEM Scale-Up Program Application Link: www.iowaSTEM.gov/Scale-Up-Application

PLTW Cybersecurity 2020-21 STEM Scale-Up Program

Grade Levels: 9-12

Information Sessions: <https://tinyurl.com/iowaPLTW>

Website: <https://www.pltw.org/our-programs/pltw-computer-science-curriculum#curriculum-4>

Video Link: <https://youtu.be/DK3oaCDOU4g>

Award Provides:

Access to Project Lead The Way's PLTW Cybersecurity curriculum and to all PLTW Computer Science program features including:

Connections with PLTW teachers both in Iowa and across the country through training and online forums

End-of-Course Assessment, a first-of-its-kind assessment measuring both technical and in-demand skills.

Ongoing access to teacher resources and learning opportunities and 24/7 school and technical support

Required software licenses

\$3,000 cash award to schools with new PLTW Computer Science programs implementing the Cybersecurity course to be used solely for professional development and associated equipment & supplies

Additional Cost(s) to Awardee In 2020-21:

Travel & lodging necessary to attend PLTW Core Training *if applicable*

Course equipment & supplies

Approximate Sustainability

Cost After Award Period: Annual PLTW Participation Fee for PLTW Computer Science (\$2,200)

Equipment and supplies including: Network Security Lab annual hosting fee (\$1,000) - an innovative, web-based virtual system isolated from the classroom and school network

Annual cost of consumables (\$180.25 per section of the course offered)

Program Summary:

Cybersecurity– the newest offering within the PLTW Computer Science program – turns a national problem into student opportunities. The course introduces the tools and concepts of cybersecurity and encourages students to create solutions that allow people to share computing resources while protecting privacy. Students solve problems by understanding the vulnerability of computational resources and closing these vulnerabilities.

The course is designed to expose high school students (grades 9-12) to the far-reaching field of cybersecurity by providing relevant learning experiences where they train for and solve real-world problems. It integrates standards from Iowa Core Mathematics and Literacy Standards, the recommended Iowa Computer Science CSTA Standards, and the Iowa 21st Century Skills through each of the four units.

Below are related course documents:

[Course Overview](#)

[Course Outline](#)
[Course Resume](#)

For more information, please contact Vic Dreier at vdreier@pltw.org.

Requirements to Implement the Program:

Educator(s) must participate and successfully complete PLTW's Cybersecurity Core Training.

An agreement and participation form indicating participation in PLTW Computer Science signed by the building administrator is required before receiving training or materials.

Professional Development:

In order to implement Cybersecurity, teachers will need to participate and successfully complete PLTW's Cybersecurity Blended Core Training.

Blended Core Training combines both in-person and online core training experiences. This model consists of a five-day immersive, in-person Core Training during the summer and ongoing, job-embedded, online support continuing during implementation of the curriculum.

The in-person portion of Cybersecurity Blended Core Training will take place July 20- 24, 2020 at the Heartland Area Education Agency in Johnston, Iowa. Online, job-embedded training will continue over the course of the school year.

STEM Scale-Up Program Application Link: www.iowaSTEM.gov/Scale-Up-Application

STEM in Action® from hand2mind 2020-2021 STEM Scale-Up Program

Grade Levels: PreK-5, available in school and out of school

Website: <http://www.hand2mind.com/STEMinAction>

Video Link: <https://www.youtube.com/watch?v=zEGLYNXZ03k&feature=youtu.be>

Correlations Link: <http://bit.ly/CorrelationsSummary>

Award Provides:

- 3 STEM in Action® modules
- Plus an additional Helicopter Hang Time Exploration-Introductory Module and one Engineering Design Process Flip Chart

Each Module Includes:

- 1 Teacher's Guide
- 6 reusable Student Activity Books
- Non-consumable and consumable materials for all activities in the module (6 sets of everything for up to 30 students)
- Editable and reproducible materials for Student Recording, Family Connection letter, STEM Teamwork Principles, STEM Prompts poster, Engineering Steps poster
- Facilitating STEM in the Classroom video
- Teacher help/set-up video, 1 per module

Additional Cost(s) to Awardee In 2020-2021:

- Travel to and from the regional professional development trainings

Approximate Sustainability Cost After Award Period:

- Replenishment of consumable items, refill kits (3 additional uses/module) cost between \$0-\$215 with a median price of \$81 per kit

Program Summary:

STEM in Action® modules follow the Engineering Design Process of defining the problem, planning solutions, making a prototype, testing the prototype, reflecting, communicating results and redesigning. These modules Integrate NGSS PRACTICES and Iowa Core MATH & ELA Curriculum while incorporating three-dimensional learning with an emphasis on engineering as well as AUTHENTIC hands-on, problem-based learning.

Every module developed in conjunction with Purdue University or Texas A & M is tested in classrooms to ensure the lessons are teacher friendly, and the activities are fun and engaging for students.

These modules:

- introduce students to the Engineering Design Process
- seamlessly integrate science, technology, engineering, mathematics, and literacy
- teach students how to work in collaborative teams to solve real-world problems

Students conduct investigations, analyze data to make evidence-based prototypes/models as possible solutions, test, make claims, communicate their findings to other teams and redesign. Math is embedded in the problems as measurement, budgeting, geometry, numeracy, fractions, data collection, etc.

There are 5–8 hands-on lessons per module. For grades K–2 each lesson takes no more than 30 min., and for grades 3–5 a lesson is 20–60 min. long. One module takes about 2–3 weeks to complete.

These lessons: require little prep time; provide flexibility for use in centers, classrooms, STEM labs, STEM camps, afterschool programs and summer school; and connect “real world” and school work through engaging activities. Each module strikes the perfect balance of rigor and ease of use.

Requirements to Implement the Program:

Educator(s) choose 3 of the 25 modules and attend a half-day of professional development. There is no digital requirement. A memorandum of understanding signed by the building administrator is required before materials can be delivered.

Professional Development:

Training includes an overview of the organization of the program, STEM teaching best practices, and a breakout session with time to explore (hands-on by grade level) your 3 modules and confirm which you will implement before you place the final order. 1 follow-up webinar to network and ask questions during the school year are also included.

Duration: 1 half-day of training

Date(s): Training dates will be offered in the summer, Tuesday-Friday, July 9-August 2, 2020

Location: Trainings are held in each of the six STEM regions

STEM Scale-Up Program Application Link: www.iowaSTEM.gov/Scale-Up-Application



STEM Innovator® 2020-2021 STEM Scale-Up Program

Grade Levels: 6-12 in school or out of school program

Information Sessions: 1/27, 2/10 (4:30pm); 2/6, 2/17 (7pm) via Zoom
<https://uiowa.zoom.us/j/607393418> or by appointment stem-innovator@uiowa.edu

Website: www.steminnovator.org

Social Media Link(s): Twitter: [@STEMInnovator](https://twitter.com/STEMInnovator)

Facebook: <https://www.facebook.com/JacobsonInstitute/>

Video Link: https://youtu.be/n_wrlmqRS0o

Award Provides:

- Online and onsite STEM Innovator® Institute
- Access to STEM Innovator® Curriculum Toolkit and Portfolio Assessment designed by STEM industry experts and the University of Iowa
- Hotel, parking, breakfast and lunch during onsite Institute
- An in-state network of professionals who share strategies across schools and leverage local, state and national partners
- STEM Innovator® certification
- STEMinars with national experts for educators and students
- Offer college credit to high school students
- Educator stipend of \$975 upon completion

Additional Cost(s) to Awardee In 2020-2021:

- Transportation to The University of Iowa, July 20-24
- Optional: Earn up to 5 graduate credits from the University of Iowa At \$149/credit

Approximate Sustainability Cost After Award Period:

- STEM Innovator® Toolkit and Portfolio Assessment Licensing Fee \$300 per teacher

Program Summary:

STEM Innovator® professional development empowers educators to design a unique innovation model for their school and district. Educators transform classrooms into incubator spaces where student teams solve real-world problems alongside industry mentors. Students demonstrate future-ready competencies through prototype development while employing the practices of science, engineering, innovation and entrepreneurship. Educators design an in-school or out of school model to meet their district's STEM education needs. The process prepares students with the skills and mindset to persist in STEM education, pursue STEM careers, and become innovators of the future.

Teachers emerge from STEM Innovator® with the capacity to implement the same tools, knowledge, and management strategies used in STEM industry, start-up, college, and university settings. These include Lean Start-up, Design Thinking, Agile, Canvassing, SCRUM, STEM practices, Maker, rapid prototyping, data-driven decision making and collaborative teaming. These innovation strategies provide students opportunities to experience and demonstrate adaptability, failing, resilience, effective communication, teamwork, critical thinking, and creativity- all skills critical for careers of the future, and become the innovators of the future.

STEM Innovator® educators have provided over 84,604 secondary students with the opportunity to engage in the innovation, invention and entrepreneurship process by leveraging partnerships with local and national mentors. High school students who submit a STEM Innovator® Portfolio demonstrating industry and college STEM innovation competencies may qualify for college credit. STEM Innovator® is research driven and provides evidence of impact on students to educators and community partners. A large, multi-year longitudinal research study indicates significant growth in 21st Century Skills (Collaboration, Creativity, Critical Thinking, Communication), Innovation and Entrepreneurial Skills and Mindsets (Resilience, Adaptability, Leadership, Teamwork, Grit, Decision Making), and NGSS Science and Engineering Practices. Significant growth persists when data is disaggregated by gender, racial classification, and school demographics. The STEM Innovator® platform assists in closing the achievement gap traditionally found in STEM education. The result is a more diverse pool of students who demonstrate and self-identify as having college and career competencies necessary to persist in STEM education and career fields.

Requirements to Implement the Program:

Educator(s) must participate in all onsite and online sessions. Teams of two or more educators from multiple disciplines receive priority registration.

Required Professional Development:

A five-day summer onsite STEM Innovator® Institute, and 10 online sessions in fall, 2020

Duration: 1 week institute on site and 1 week equivalent online

Date(s): July 20-24, 2020 on site and online July 1-December 15, 2020

Location: University of Iowa onsite; online from home institution

Questions: Dr. Leslie Flynn, leslie-flynn@uiowa.edu

STEM Scale-Up Program Application Link: www.iowaSTEM.gov/Scale-Up-Application

Grade Levels: 4-8; available in or out of school

Information Sessions: <https://www.roboticseducation.org/new-to-robotics/>

Website: <https://www.roboticseducation.org/>

Video Link: <https://www.roboticseducation.org/current-game-information/>

Award Provides:

- VEX IQ Challenge materials
- 8 hours of professional development plus a sub stipend
- Breakfast and lunch while attending PD
- Student curriculum
- Continuing online education available as needed for educators
- Technical support
- One school year of team competition registration fees
- One school year of local competition fees

Additional Cost(s) to Awardee In 2020-2021:

- travel costs to attend regional, state or national competitions if a team qualifies

Approximate Sustainability Cost After Award Period:

- Team registration fee \$150 annually
- Replacement parts vary but under \$100, including shipping, if something breaks

Program Summary:

The path towards a passion for STEM starts early. The VEX IQ Challenge Robotics Competition program provides 4th – 8th grade students with a snap-together robotics system designed from the ground up to provide the opportunity to learn introductory programming and engineering skills. The study of robotics inherently incorporates all four pillars of STEM through hands-on, student-centered learning. The program can be implemented in a classroom or out-of-school time club setting and is ongoing throughout the school year.

The VEX IQ Challenge kit is self-contained. No fabrication, welding or special tools are needed for construction. Kits do not take up much storage space and building them only requires regular classroom table space. One kit will serve up to 4 students. The programming software is preloaded onto the robot brain and any classroom computer/laptop or chromebook can communicate with the robot. In addition to technical engineering, programming and design notebook skills, the program teaches highly sought-after soft skills such as communication, creative thinking, teamwork and time management. Tech industry employers have stated that they look for soft skills before technical skills when interviewing potential employees and that success in the workplace is 80% dependent upon soft skills.

Sustainability:

- VEX Robotics programs are student centered meaning no previous robotics experience is needed of the educator (coach).
- VEX Robotics programs are affordable and sustainable. The robot kit lasts for up to 5 years. Replacement parts are inexpensive, and the only additional fees needed each year are team registration fees for the team to participate in official VEX competitions locally, regionally, and at the state level. The program can stand alone without competition participation.
- With the initial award, free student curriculum and continuing teacher professional development education is available online and a technical support team is available to answer questions.

Time commitment:

For out-of-school time programs, educators will spend up to **two 1-2 hour blocks of time weekly**. Local competition events usually take place after school and on weekends. Attendance at competitions is optional.

Requirements to Implement the Program:

1. **Attendance at 8 hours of professional development; additional educator support is available as needed.**
2. **Each team needs a coach, a meeting place, and technology to support the program. Any computer or laptop will support one team.**

Professional Development:

8 hours of Professional Development.

Duration: 1 day on site

Date(s): In-State options will be offered during the months of July and August

Location: TBD. Regional training planned

VEX V5 – Presented by the REC Foundation 2020-2021 STEM Scale-Up Program

Grade Levels: 9-12; available in or out of school

Information Sessions: <https://www.roboticseducation.org/new-to-robotics/>

Website: <https://www.roboticseducation.org/>

Video Link: <https://www.roboticseducation.org/current-game-information/>

Award Provides:

- VEX V5 materials
- 16 hours of professional development plus a sub stipend
- Hotel, breakfast and lunch while attending PD
- Student curriculum
- Continuing online education available as needed for educators
- Technical support
- One school year of team competition registration fees
- One school year of local competition fees

Additional Cost(s) to Awardee In 2020-2021:

- travel costs to attend regional, state or national competitions if a team qualifies

Approximate Sustainability Cost After Award Period:

- Team registration fee \$150 annually
- Replacement parts vary but under \$100, including shipping, if something breaks

Program Summary:

Not enough students are choosing STEM-related paths to meet the growing global demand. VEX V5 changes the way STEM is taught. The V5 Robotics Competition program provides 9th – 12th grade students with a snap-together robotics system designed from the ground up to provide the opportunity to learn introductory and advanced programming and engineering skills. The study of robotics inherently incorporates all four pillars of STEM through hands-on, student-centered learning. The program can be implemented in a classroom or out-of-school time club setting and is ongoing throughout the school year.

The V5 kit is self-contained. No fabrication, welding or special tools are needed for construction. Kits do not take up much storage space and building them only requires regular classroom table space. One kit will serve up to 10 students. The programming software is preloaded onto the robot brain and any classroom computer/laptop or chromebook can communicate with the robot. In addition to technical engineering, programming and design notebook skills, the program teaches highly sought-after soft skills such as communication, creative thinking, teamwork and time management. Tech industry employers have stated that they look for soft skills before technical skills when interviewing potential employees and that success in the workplace is 80% dependent upon soft skills.

Sustainability:

- VEX Robotics programs are student centered meaning no previous robotics experience is needed of the educator (coach).
- VEX Robotics programs are affordable and sustainable. The robot kit lasts for up to 5 years. Replacement parts are inexpensive, and the only additional fees needed each year are team registration fees for the team to participate in official VEX competitions locally, regionally, and at the state level. The program can stand alone without competition participation.
- With the initial award, free student curriculum and continuing teacher professional development education is available online and a technical support team is available to answer questions.

Time commitment:

For out-of-school time programs, educators will spend up to **two 1-2 hour blocks of time weekly**. Local competition events usually take place after school and on weekends. Attendance at competitions is optional.

Requirements to Implement the Program:

3. **Attendance at 16 hours of professional development; additional educator support is available as needed.**
4. **Each team needs a coach, a meeting place, and technology to support the program. Any computer or laptop will support one team.**

Professional Development:

16 hours of Professional Development.

Duration: 2 day on site

Date(s): In-State options will be offered during the months of July and August

Location: TBD. Regional training planned

STEM Scale-Up Program Application Link: www.iowaSTEM.gov/Scale-Up-Application